

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US05/03917

<b>A. CLASSIFICATION OF SUBJECT MATTER</b>		
IPC(7) : A01N 63/00; C07H 21/02, 21/04; C12N 15/00, 15/63		
US CL : 424/93.2, 93.21; 435/320.1, 455; 536/23.1, 23.5, 24.1		
According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b>		
Minimum documentation searched (classification system followed by classification symbols) U.S. : 424/93.2, 93.21; 435/320.1, 455; 536/23.1, 23.5, 24.1		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) WEST, STN, MEDLINE, CAPLUS, BIOSIS, SCISEARCH, LIFESCI		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	GE et al., Gene Transfer of the Caenorhabditis elegans n-3 Fatty Acid Desaturase Inhibits Neuronal Apoptosis, Journal of Neurochemistry, September 2002, Vol. 82, No. 6, pages 1360-1366, especially abstract.	1-3, 7-16
Y	WO 01/96385 A1 (SMITHKLINE BEECHAM BIOLOGICALS S.A.) 20 December 2001 (20.12.2001), especially abstract, page 5.	1-3, 7-16
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.		
* Special categories of cited documents:		
"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention	
"E" earlier application or patent published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone	
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art	
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family	
"P" document published prior to the international filing date but later than the priority date claimed		
Date of the actual completion of the international search 17 November 2005 (17.11.2005)		Date of mailing of the international search report 22 DEC 2005
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (571) 273-3201		Authorized officer Shin-Lin Chen Telephone No. 703-308-0196

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## Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☒ Claims Nos.: 6 and 45  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:  
Claims 6 and 45 are not searchable because the claims recite the nucleotide sequence shown in Figure 18, however, no sequence listing for the nucleotide sequence in Figure 18 has been provided.
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:  
Please See Continuation Sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of any additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.: 1-5 and 7-16

- Remark on Protest
- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
  - ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
  - ☐ No protest accompanied the payment of additional search fees.

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## BOX III. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, claim(s) 1-5 and 7-16, drawn to an isolated nucleic acid molecule comprising a sequence encoding an enzyme that desaturates n-6 fatty acid to n-3 fatty acid, wherein the sequence comprises at least one optimized codon, an expression vector comprising said nucleic acid molecule, a host cell comprising said expression vector, and a pharmaceutical composition comprising said expression vector.

Group II, claim(s) 17-21 and 30-44, drawn to a non-human transgenic animal comprising the nucleic acid molecule of claim 1, a food product or dietary supplement comprising the non-human transgenic animal or tissue or processed part thereof, and a method of improving the content of n-3 fatty acid in a subject's diet by administering to said subject the food product or dietary supplement.

Group III, claim(s) 22 and 23, drawn to a method of treating a patient having a cancer with the nucleic acid molecule of claim 1.

Group IV, claim(s) 24-26, drawn to a method of inhibiting neuronal cell death in a subject by administering to the subject the nucleic acid molecule of claim 1.

Group V, claim(s) 27 and 28, drawn to a method of treating a subject having a condition associated with an insufficiency of n-3 polyunsaturated fatty acid (PUFA) by administering to the subject the nucleic acid molecule of claim 1.

Group VI, claim(s) 29, drawn to a method of treating a subject having a transplant comprising a biological organ, tissue, or cell, comprising administering to either the subject or the transplant the nucleic acid molecule of claim 1.

The inventions listed as Groups I-VI do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: Groups I-VI share a common feature of the nucleic acid molecule of claim 1. However, Ge et al., 2002 (Journal of Neurochemistry, Vol. 82, No. 6, p. 1360-1366) teaches generation of a recombinant adenovirus vector carrying the fat-1 gene of *C. elegans*, which is an n-3 fatty acid desaturase gene. Cells transduced with the adenovirus vector show decreased n-6: n-3 PUFA ratio and significant inhibition of growth factor withdrawal-induced apoptotic cell death in neurons expressing the fat-1 gene (e.g. abstract). Bollen et al., 2001 (WO 01/96385) teaches optimization of codon in the polynucleotide encoding insect protein for efficient expression of said insect protein in mammalian cells (e.g. abstract, page 5). Thus, no special technical feature of groups I-VI has been contributed by the present invention over the prior art. Therefore, groups I-VI do not relate to a single general inventive concept under PCT Rule 13.1.